# TECHNIQUES TO PREVENT SAMPLE CONTAMINATION 4.0

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Contamination of water samples can be prevented by planning the order in which sites will be sampled and by recognizing potential sources of contamination. NFM 1 provides information on reconnaissance of field sites. Sites should be sampled in the order of least to greatest potential for equipment fouling or contamination. The cleanest sites are often those that are in pristine environments, in areas where concentrations of dissolved solids are low, or upstream or upgradient from known or suspected sources of contamination.

The most common causes of sample contamination during sample collection include poor sample-handling techniques, atmospheric input, inadequately cleaned equipment, and use of equipment constructed of materials inappropriate for the analytes targeted for study. Contamination of samples from these sources can be prevented or minimized by adhering to good field practices (table 4-1). Use of Clean Hands/Dirty Hands sampling techniques is described in section 4.0.1, along with other clean-sampling procedures. Field rinsing of equipment to be used to collect and process samples is described in section 4.0.2. The considerations and planning required for collecting ground-water or other samples that contain gases are described in section 4.0.3. Collection of equipment blanks and field blanks is necessary to help identify potential sources of sample contamination (section 4.3). The same equipment that is used to collect (and/or process) environmental samples is to be used to collect (and/or process) blank samples.

**Sample at sites with the least contamination or lowest chemical concentrations first.**

**Table 4-1.** Good field practices for collection of water-quality samples

[Modified from "Rules for Trace-Metal Sampling" by Howard Taylor, U.S. Geological Survey, written communication, 1992; NFM, *National Field Manual for the Collection of Water-Quality Data*]

- Be aware of and record potential sources of contamination at each field site.
- Wear appropriate disposable, powderless gloves:
  - Change gloves before each new step during sample collection (and processing).
  - Avoid hand contact with contaminating surfaces (such as equipment, coins, food).
- Use equipment constructed of materials that are relatively inert with respect to the analytes to be collected (NFM 2).
- Use only equipment that has been cleaned according to prescribed procedures (NFM 3).
- Field rinse equipment, but only as directed. Some equipment for some analytes should not be field rinsed.
- Use correct sample-handling procedures:
  - Minimize the number of sample-handling steps.
  - Use Clean Hands/Dirty Hands techniques (table 4-2) as required for parts-per-billion trace-element sampling. Adapt Clean Hands/Dirty Hands techniques for other sample types, as appropriate. Obtain training for and practice field techniques under supervision before collecting water samples.
- Collect (and process) samples in enclosed chambers so as to minimize contamination from atmospheric sources.
- Collect a sufficient number of appropriate types of quality-control samples.
- Follow a prescribed order for collecting samples.